

Claims

What is claimed is:

1. A method for analyzing a sample containing particles to detect and characterize target particles having a plurality of detectable characteristics in a fixed volume capillary that contains a fluorescent background and which exhibits background characteristics, the method comprising:
 - 10 (a) scanning the fixed volume capillary containing the sample to generate a plurality of channels of data, wherein each channel of data comprises a distinct detectable characteristic and a distinct background characteristic;
 - (b) sampling each of the channels of data to produce corresponding sets of pixel values;
 - 15 (c) generating sets of enhanced pixel values by independently modifying each set of pixel values to selectively enhance spatial features that are indicative of a target particle;
 - (d) removing from one or more sets of enhanced pixel values the distinct background characteristic for the corresponding channel;
 - (e) independently establishing noise threshold values for the detection of said particles for each set of enhanced pixel values;
- 20 (g) independently identifying, in each set of enhanced pixel values, groups of above-threshold pixels located in patterns that are diagnostic of said particles;
- (h) independently identifying, for each group of above-threshold pixels located in a diagnostic pattern in a particular set of enhanced pixel values, the

corresponding below-threshold or at-threshold pixels in the remaining sets of enhanced pixel values; and

5 (i) characterizing the target particles in the sample by analyzing the pixels independently identified in steps (g) and (h);

10 whereby particles are initially identified and analyzed in channels with above-threshold pixels located in patterns diagnostic of said particles, and said particles are then independently analyzed in all remaining channels by locating pixels in the same positions as the above-threshold pixels initially identified.

2. In a method for analyzing a sample containing particles to detect and characterize target particles having a plurality of detectable characteristics in a fixed volume capillary that contains a fluorescent background and which exhibits 15 background characteristics, the method comprising:

(a) scanning the fixed volume capillary containing the sample to generate a plurality of channels of data, wherein each channel of data comprises a distinct detectable characteristic and a distinct background characteristic;

20

(b) sampling each of the channels of data to produce corresponding sets of source pixel values;

25

(c) summing the sets of source pixel values to generate a composite image;

30

(d) calculating a threshold for particle detection in said composite image;
(e) performing particle detection in said composite image using said threshold;

(f) identifying, for each particle identified in said composite image, the corresponding pixels in the sets of source pixel values; and

5 (g) analyzing the pixels identified in step (f);

the improvement comprising:

10 (i) calculating the threshold for particle detection independently in each set of source pixel values;

(ii) performing particle detection independently in each set of source pixel values using the corresponding threshold; and

15 (iii) identifying, for each particle identified in a particular set of source pixel values in step (2), the corresponding pixels in the remaining sets of source pixel values; and

(iv) analyzing the pixels identified in steps (2) and (3).

20

3. In a method for analyzing a sample containing particles to detect target particles having a plurality of detectable characteristics in a fixed volume capillary that contains a fluorescent background and which exhibits background characteristics, the method comprising;

25

(a) scanning the fixed volume capillary containing the sample to generate a plurality of channels of data, wherein each channel of data comprises a distinct detectable characteristic and a distinct background characteristic;

(b) sampling each of the channels of data to produce corresponding sets of source pixel values;

5 (c) summing the sets of source pixel values to generate a composite image;

(d) calculating a threshold for particle detection in said composite image;

(e) performing particle detection in said composite image using said threshold;

10 the improvement comprising:

(i) calculating the threshold for particle detection independently in each set of source pixel values without first summing the source images; and

15 (ii) performing particle detection independently in each set of source pixel values using the corresponding threshold.